

Appl. No. 10/090,917
Amendment and/or Response
Reply to Office action of 25 March 2004

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Amendments to the Claims:

A listing of the entire set of pending claims (including amendments to the claims, if any) is submitted herewith per 37 CFR 1.121. This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently amended) A tilt control device for controlling inclination of a recording surface of an optical disc ~~(4)~~, ~~said the~~ tilt control device comprising:
 - a) a tilt detector that is configured to detect the ~~detecting means (3) for detecting~~ ~~said inclination of said the~~ recording surface;
 - b) a focus controller that is configured to generate ~~control means (7) for~~ ~~generating~~ a focus controlling output; and
 - c) a focus actuator that is configured to control ~~actuating means (11) for~~ ~~controlling~~ a focusing state of an optical recording/reproducing beam based on ~~said the~~ focus controlling output,
characterized by
 - d) a calibration element that is configured to calibrate ~~calibrating means (10) for~~ ~~calibrating~~ an output offset of ~~said tilt detecting means~~ the tilt detector by using ~~said the~~ focus controlling output.
2. (Currently amended) A device according to claim 1, ~~characterized in that said~~ ~~calibrating means (10)~~ wherein the calibration element is arranged to measure a mean focus controlling output and to use ~~said the~~ mean focus controlling output for calibration.
3. (Currently amended) A device according to claim 1, ~~characterized in that said~~ wherein the focus controlling output is a focus voltage or a controller integrator output.

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4. (Currently amended) A device according to claim 1, ~~characterized by further including:~~

a sledge ~~(4)~~ for moving an optical pickup unit,
a tilt platform ~~(5)~~ for changing ~~said the~~ inclination of ~~said the~~ recording surface,
a tilt adjusting means ~~(9)~~ adjuster for adjusting ~~said the~~ tilt platform ~~(5)~~, and
a tilt control means ~~(10)~~ controller for controlling ~~said the~~ sledge ~~(4)~~ and ~~said the tilt adjuster adjusting means (9)~~.

5. (Currently amended) A device according to claim ~~5~~ 4, wherein ~~characterized in that~~ ~~said tilt control means (10)~~

the tilt controller is arranged to:

position ~~said the~~ sledge ~~(4)~~ at a radius corresponding to the rotation point between a tilt frame defined by ~~said the~~ tilt platform ~~(5)~~ and ~~said the~~ optical disc ~~(1)~~, to

move ~~said the~~ sledge ~~(4)~~ outward over a first predetermined distance,
to

control ~~said tilt adjusting means (9)~~ the tilt adjuster to adjust ~~said the~~ tilt platform ~~(5)~~ until the same output value of ~~said the~~ focus control means ~~(7)~~ controller as obtained at ~~said the~~ radius corresponding to ~~said the~~ rotation point is obtained,
and to

move ~~said the~~ sledge ~~(4)~~ inward over a second predetermined distance,
and wherein ~~said calibrating means (10)~~

the calibration element is arranged to use the output value of ~~said tilt detecting means (3)~~ the tilt detector obtained at ~~said the~~ second predetermined distance as ~~said the~~ output offset used for ~~said the~~ optical disc ~~(1)~~.

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6. (Currently amended) A device according to claim-~~6~~ 5, ~~wherein characterized in that~~
~~said~~

the second predetermined distance substantially corresponds to the half of
~~said~~ the first predetermined distance.

7. (Original) An optical disc player comprising a tilt control device as claimed in
claim 1.

8. (Currently amended) A tilt control method for controlling inclination of a recording
surface of an optical disc ~~(4)~~, ~~said tilt control method comprising the steps of:~~

- a) generating a focus controlling output, and
- b) controlling a focusing state of an optical recording/reproducing beam based on
~~said~~ the focus controlling output, and
characterized by
- e) calibrating an output offset of a tilt ~~detectordetecting means (3)~~ by using said
the focus controlling output.

9. (Currently amended) A method according to claim-~~10~~ 8, ~~wherein characterized in~~
~~that said~~

calibrating ~~step~~ the output comprises measuring a mean focus controlling
output and using ~~said~~ the mean focus controlling output for calibration.

10. (Currently amended) A method according to claim-~~10~~ 8, ~~characterized in that said~~
wherein calibrating ~~step~~ the output comprises:

measuring ~~said~~ the focus controlling output at a rotation point between a tilt
frame defined by a tilt platform-~~(5)~~ and ~~said~~ the optical disc-~~(4)~~,

adjusting ~~said~~ the tilt platform-~~(5)~~ until the same focus controlling output is
obtained at a first predetermined distance outward from ~~said~~ the rotation point, and

using a focus controlling output obtained at a second predetermined distance
inward from ~~said~~ the first predetermined distance as ~~said~~ the output offset of ~~said~~ the
~~detecting means (3)~~ the tilt detector for ~~said~~ the optical disc-~~(4)~~.

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11. (Currently amended) A method according to claim 10, ~~wherein characterized in that said~~

the second predetermined distance corresponds substantially to the half of said the first predetermined distance.

12. (Currently amended) A tilt control device for controlling inclination of a recording surface of an optical disc (4), ~~said tilt control device comprising: a) focus control means (7) for generating~~

a focus controller that is configured to generate a focus controlling output; and b) focus actuating means (11) for controlling

a focus actuator that is configured to control a focusing state of an optical recording/reproducing beam based on said the focus controlling output; and, characterized by c) tilt control means (10) for adjusting

a tilt controller that is configured to adjust a tilt frame based on measurements of the controlling output of said focus control means (7) the focus controller at at least two different radial positions at two tilt frame positions.

13. (Currently amended) A device according to claim ~~14~~ 12, ~~wherein characterized in that said~~

the focus controlling output is a focus voltage or a controller integrator output.

14. (Currently amended) A device according to claim ~~14~~ 12, ~~characterized by further including:~~

a sledge (4) for moving an optical pickup unit,

a tilt platform (5) for changing ~~said the~~ inclination of ~~said the~~ recording surface,

a tilt adjusting means (9) adjuster for adjusting ~~said the~~ tilt platform (5),

wherein said

the tilt control means (10) controller is arranged to control ~~said the~~ sledge (4) and ~~said the~~ tilt adjusting means (9) adjuster so as to perform ~~said the~~ measurements.

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15. (Currently amended) A device according to claim ~~17~~ 14, ~~characterized in that said wherein the tilt control means~~ ~~(10) controller~~ is arranged to:

position ~~said the sledge~~ ~~(4)~~ at ~~said the~~ at least two different radial positions, to control ~~said the tilt adjusting means~~ ~~(9) adjuster~~ to adjust ~~said the~~ tilt platform ~~(5)~~ to ~~said the~~ two predetermined tilt frame positions, to

measure ~~said the~~ focus controlling output at ~~said the~~ at least two different radial positions at ~~said the~~ two different radial tilt positions, and to

adjust ~~said the~~ tilt platform ~~(5)~~ based on the mean radial tilt obtained for ~~said the~~ two predetermined tilt frame positions in between ~~said the~~ at least two different radial positions.

16. (Currently amended) An optical disc player comprising a tilt control device as claimed in claim ~~14~~ 12.

17. (Currently amended) An optical disc player as claimed in claim ~~19~~ 16, wherein ~~said~~

the optical disc player is a DVD player.

18. (Currently amended) A tilt control method for controlling inclination of a recording surface of an optical disc ~~(1)~~, ~~said tilt control method comprising the steps of:~~

a) generating a focus controlling output, and
b) controlling a focusing state of an optical recording/reproducing beam based on ~~said the~~ focus controlling output, and

characterized by

e) adjusting a tilt frame based on measurements of ~~said the~~ controlling output at at least two different radial positions at two predetermined tilt frame positions.

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19. (Currently amended) A method according to claim-21_18, wherein characterized
~~in that said~~

adjusting ~~step the tilt frame~~ comprises measuring a mean focus controlling
output and using ~~said the~~ mean focus controlling output for adjustment.

20. (Currently amended) A method according to claim-21_18, wherein characterized
~~in that said adjusting step the tilt frame~~ comprises:

measuring ~~said the~~ focus controlling output at ~~said the~~ at least two different
radial positions at ~~said the~~ two different radial tilt positions, and

adjusting ~~said the tilt platform (5)~~ based on the mean radial tilt obtained for
~~said the~~ two predetermined tilt frame positions in between ~~said the~~ at least two
different radial positions.

21. (New) A device according to claim 2, further including:

- a sledge for moving an optical pickup unit,
- a tilt platform for changing the inclination of the recording surface,
- a tilt adjuster for adjusting the tilt platform, and
- a tilt controller for controlling the sledge and the tilt adjuster.

22. (New) A device according to claim 21, wherein

the tilt controller is arranged to:

position the sledge at a radius corresponding to the rotation point
between a tilt frame defined by the tilt platform and the optical disc,
move the sledge outward over a first predetermined distance,
control the tilt adjuster to adjust the tilt platform until the same output
value of the focus controller as obtained at the radius corresponding to the rotation
point is obtained, and

move the sledge inward over a second predetermined distance, and
the calibration element is arranged to use the output value of the tilt detector
obtained at the second predetermined distance as the output offset used for the
optical disc.

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23. (New) An optical disc player comprising a tilt control device as claimed in claim 21.

24. (New) A method according to claim 9, wherein calibrating the output comprises:
measuring the focus controlling output at a rotation point between a tilt frame defined by a tilt platform and the optical disc,

adjusting the tilt platform until the same focus controlling output is obtained at a first predetermined distance outward from the rotation point, and

using a focus controlling output obtained at a second predetermined distance inward from the first predetermined distance as the output offset of the tilt detector for the optical disc.

25. (New) A method according to claim 24, wherein

the second predetermined distance corresponds substantially to the half of the first predetermined distance.

26. (New) An optical disc player comprising a tilt control device as claimed in claim 14.

27. (New) A method according to claim 19, wherein adjusting the tilt frame comprises:

measuring the focus controlling output at the at least two different radial positions at the two different radial tilt positions, and

adjusting the tilt platform based on the mean radial tilt obtained for the two predetermined tilt frame positions in between the at least two different radial positions.